REMARKS

The courtesies extended to the undersigned by Primary Examiner Ren Yan during the interview held June 15, 2009 are acknowledged and appreciated. Applicant, his principal representatives in Germany, and the undersigned have carefully reviewed the Final Office Action of March 20, 2009 in the subject U.S. patent application, together with the prior art cited and relied on in the rejection of the claims. In response, claim 43 has been amended to more clearly patentably define the subject invention over the prior art cited and relied with. As discussed with Examiner Yan during the interview of June 15, 2009, these changes to claim 43 will require additional consideration by Examiner Yan. A Request for Continued Examination (RCE) is being filed concurrently herewith to provide the Examiner with the opportunity to further consider the claims that are now pending in the subject U.S. patent application.

As discussed with Examiner Yan on June 15, 2009, as described and depicted in the Substitute Specification and in the drawings which are currently pending in the subject application, and as recited in currently amended claim 43, the subject invention is directed to a method for compensation for at least one of a transverse elongation and a longitudinal elongation of a web that is being printed. The subject invention is directed principally to a method for compensating for transverse elongation or "fan-out" of the material web during such printing.

Web transverse elongation or fan-out is a well know source of register errors, particularly in multi-color offset printing in a web-fed rotary printing press. The web is printed as it passes through several printing groups that each imprint one color of the multi-color image to the web. The printing ink that are used are liquid based. The

printing is accomplished using a dampening fluid in conjunction with the ink. The web is placed under a certain amount of tension as it is pulled through the plurality of printing groups. All of these features cause the web to stretch or elongate both laterally and longitudinally.

There are various procedures and devices that are known in the prior art to be usable for the control of, or compensating for fan out or transverse elongation of a web of material. Typically, print images are applied to printing formes that are then mounted on forme cylinders and a test run of the printing press is conducted. The printed images are evaluated for any register errors and steps are then taken to reduce these register errors. Such steps typically involve the axial or circumferential repositioning of the printing formes on the forme cylinder and/or the use of an image regulator to reduce the width of the material web intermediate subsequent printing groups as an effort to compensate for the transverse elongation of the web which has occurred.

These known methods for web fan out control and compensation are all taken in response to the sensed web transverse elongations. In other words, they are all reactive. None are proactive. In contrast, as will be discussed hereinafter, the method for compensating for web elongation is a combination of proactive and reactive steps that results in a better control of both transverse and longitudinal web elongation and particularly in better control of web transverse elongation.

In the subject method, as set forth in currently amended claim 43 there is provided a three step or a three component method for compensating for web elongation and particularly for web transverse elongation. The first step is to estimate an anticipated one of at least one of the transverse and longitudinal elongations that are

expected to occur during the printing of the material web. Each type of material web will have a predictable reaction to being contacted by ink and dampening fluid and to being tensioned in the printing press. This anticipated elongation is a function of the constituency of the material web, the type of ink and dampening fluids being used, the tension levels in the printing invention and even the weather conditions and the printing plant conditions. The Examiner is invited to review the discussion at paragraph 007 of the Substitute Specification in regards to the compensation for the known amount of web elongation that is anticipated to occur.

Based on this anticipated web elongation, the print images are applied to the printing forme at print image locations before the printing formes are positioned on the forme cylinders. This is discussed in paragraph 032 and 033 of the Substitute Specification. The print image locations on successive ones of the printing formes carried by successive ones of the forme cylinders is a proactive way to compensate for the anticipated web lateral and longitudinal elongation which will occur. If the elongation characteristics of a particular web of material are known, typically based on prior experience with that type of material web, the print image locations can be applied to the respective printing formes in anticipation of the known web elongation and prior to the time where the printing formes are placed on the forme cylinders. In the large majority of situations, the proactive step of positioning the print image locations on the print formes prior to application of the printing formes on the forme cylinders and based on the anticipated web elongation which is predicted will occur, is sufficient to counteract the fan out effect which it is known that the web will experience as it is being

printed. This is the first step in the three steps or three element method recited in currently amended claim 43.

An image regulator is recited in claim 43 as being located between first and second printing groups. Image regulators are generally known in the art and are used to reduce the width of a web in response to the fan out effect which has occurred in the web. Such image regulation devices are mechanical assemblies whose purpose it is to reduce the effective width of the web. Typically, the web is deformed so that it has a plurality of minute, longitudinally extending ripples or corrugations. These are not visible to the naked eye and are imparted to the web by the image regulator solely for the purpose of controlling web fan out. However, the use of such an image regulator is not a perfect solution to the problem of web fan-out. Tension which is exerted on the web during the printing process can counteract the effects of the web corrugation or width reduction caused by the image regulator. The web can re-elongate as it continues to be printed in subsequent printing couples. Also, the step of corrugating the web is somewhat inaccurate. The less the width compensation that has to be accomplished using an image regulator, the better.

In the present invention, as recited in claim 43, the image regulator is the second step in the three tiered approach to controlling web fan-out. As discussed at the end of paragraph 032 of the Substitute Specification, the effects of web fan-out may be completely compensated for by the initial step of placing the print image locations on the printing formes prior to the placement of the printing formes on the respective forme cylinders. However, if it is determined that there still is an actual amount of web transverse elongation, larger than what was anticipated would occur where the print

image locations were situated on the printing formes, the image regulator can be used to deform the web of material to compensate for that actual determined web transverse elongation greater that the previously estimated transverse elongation.

An image regulator has practical limits on how much it can physically deform the material web to compensate for actual web transverse elongations that are larger than anticipated. As was discussed above, the corrugation of the web can only be done to a limited degree and may not be a permanent solution to the problem. Its benefits are that the image regulator is relatively simple in structure and is easily controlled. It can be placed between sequentially located printing groups without requiring elaborate or sophisticated structures or mounting assemblies.

It is generally known in the prior art to provide printing forme shifting assemblies in the printing cylinders on which the printing formes are placed. Such devices are described in paragraph 023 of the Substitute Specification, at the last several sentences thereof. These forme shifting assemblies include actuators that can slide register pins axially in the printing forme end receiving channels which are located in each forme cylinder. Such a printing forme shifting will be effective to counteract the effects of web fan-out. The limitation of these controllable activities is that they are mechanically complicated structures which must be placed within forme cylinders and which thus require space and increase costs.

In the present invention, as recited in currently amended claim 43, the forme cylinders are provided with controllable printing forme shifting assemblies. If the actual transverse elongation of the material web is greater than an amount of such transverse elongation which can be handled by the image regulator, then the printing forme shifting

assembly can also be brought into operation as the third step or third tier of web elongation, and particularly of web transverse elongation control.

In the majority of printing applications, the first steps of the claimed method for compensating for at least one of transverse and longitudinal web elongation by positioning the print images at print image locations on the forme cylinders, in accordance with an estimative anticipated web transverse elongation, will be sufficient to counteract any web fan-out effects that may occur. The second and third steps of using an image regulator and of using a controllable printing forme shifting assembly are brought into play only when the first step has not completely overcome the problem. In this regard, the use of the image regulator and the use of the printing forme shifting assembly are fine tuning steps which are available, if needed, but which often will not be required to be actuated.

In the Final Office Action of March 20, 2009, claim 43 was objected to as having several possible typographical or recitational errors. Claim 43 has been amended to remove the typographical error and to more clearly assert that the displacing of the forme cylinder is what is done in the direction laterally to the production direction. Claim 43, as currently amended, is believed to overcome the objections raised in the Final Office Action.

Claim 43 was rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1182035 to Kusunoki in view of U.S. Patent No. 5,806,430 to Rodi and further in view of U.S. Patent No. 6,550,384 to Langsch. Claims 55-57 were rejected under 35 U.S.C. 103(a) as being unpatentable over the above combination of references and further in view of U.S. Patent No. 5,816,151 to Wang.

As discussed with Examiner Yan on June 15, 2009, the Examiner who was previously handling the subject application and who issued the Final Office Action of March 20, 2009, made various assertions regarding the references which do not appear to be supported by a careful reading of each of these references. These assertions include statements of teachings indicated as being present in the references which, in fact, do not appear to be present in those references.

Referring initially to EP 1182035 to Kusunoki and as was discussed in the prior Amendment, that reference is the equivalent of U.S. Application No. 2002/0023558. The reference was discussed in detail in the prior Amendment and Examiner Yan is requested to review that discussion. As was noted during the interview, the Kusunoki reference is directed to a printing press in which each print unit includes a pair of plate cylinders PC. Each such plate cylinder PC is divided axially into halves PC_1 and PC_2. A pair of printing plates are mounted on each of the respective halves PC_1 and PC_2 of each plate cylinder. Registration errors are compensated for by axial and/or circumferential shifting of either one or the other, or possibly of both of the halves PC_1 and PC_2 of the plate cylinder PC.

In the discussion of the Kusunoki reference in the Final Office Action, several incorrect statements were made. It is recited in the Final Office Action, at the bottom of page 3 and the top of page 4 that the printing formes are respositioned on the printing cylinders in response to one of a transverse elongation and a longitudinal elongation. In fact, as discussed at paragraph 035, it is the plate cylinder halves PC_1 and PC_2 and the printing plates that are carried thereby, which are independently movable axially and circumferentially to accomplish fine image regulation.

It was admitted in the Final office Action that Kusunoki does not show that any adjustment is carried out based on the elongation of the web prior to printing. Kusunoki is further admitted as failing to teach or to suggest the provision of an image regulator.

The Rodi reference is relied on as teaching the determination of web elongation prior to the printing of the material and as further teaching the compensating for each web elongation by locating the print image locations on the forme cylinder 1 prior to the printing of the web. As was the case in the discussion of Kusunoki reference, the teachings attributed to the Rodi reference by the prior Examiner are not supported by a careful reading of the reference.

Initially, it is to be noted that the Rodi patent is directed primarily to an ink jet printing unit. As such, it is not particularly relevant to the subject invention. The so-called forme cylinders 1 depicted in Fig. 1 and referred to in the Office Action are actually digital printing units. As discussed at column 5, lines 11-15, these printing units are ink jet arrays or printing units with a writing head that produces latent-charge images on a cylinder. Clearly, these are not printing formes carried by a forme cylinder and having print image locations formed on the printing formes prior to mounting of the printing forme on the forme cylinder. The prior Examiner's discussion of the relevancy of the Rodi reference is thus totally flawed by his misunderstanding of the operation of the printing units 1.

The references to POSTSCRIPT in connection with the Rodi reference appears to be in the context of the storage of information regarding prior print applications in an image modification circuit 5. That image modification circuit 5 is usable to vary the image applied to the material to be printed by the ink jet arrays 1. This information uses

registration errors that were stored from prior similar printing jobs that were done using the same equipment. There does not appear to be any discussion of the uses of an estimation of an anticipated elongation of the web of material in connection with the operation of the ink jet printers 1.

As was discussed with Examiner Yan during the interview of June 15, 2009, there are portions of the Rodi reference that are possibly of some relevance to the subject invention. Rodi mentions, at column 1, lines 39-43, the substrate that is used to accomplish the printing could be"...a premounted printing form to which images are applied directly..." in accordance with digital image information. As is further recited at column 2, lines 18-28 these printing formes are firmly mounted on the cylinder before they are exposed. In the subject application, as recited in claim 43, the print image locations are applied to the printing formes before they are positioned on the forme cylinders. Greater accuracy and flexibility is provided by this process.

Rodi does recite, at column 2, lines 7-11 that in order to compensate for stretching errors, compression of the printed image can be attained. This would appear to be directed to longitudinal elongation of the web, not to transverse elongation of the web. This passage of Rodi also makes reference to "...manipulating the printing formes appropriately in advance.". It is to be noted that this is a reference to printing forme manipulation not to print image location on a printing forme. It is also to be noted that this brief sentence has no discussion regarding how the printing formes are manipulated or why they are manipulated other than in order to compensate for stretching errors. As noted above, these stretching errors are set forth at the bottom of column 1 as ones in

which the length of the color separation is changed in the direction of motion of the machine printable substrate; i.e. in the longitudinal direction.

In the discussion of the Rodi reference in the Final Office Action, it is set forth that Fig. 2 shows the determining of an amount of an anticipated longitudinal elongation. That assertion is believed to be incorrect. Figs. 2a-2d show various registration errors. These figures show a sheet or a portion of a printable substrate before or after it passes the printing units 1, as recited at column 5, lines 60-63. There is no discussion or suggestion of anticipated elongation, either longitudinal or transverse. At column 6, lines 14-16, it is recited that these register errors can be determined by the carrying out of a calibrating run; i.e. a test run. Once the amounts of the register errors have been determined, an evaluation circuit 10 generates register error signals. These register error signals are used in the image processor 6 or for layout. There is no discussion in Rodi of the estimation of anticipated elongations and of the use of those estimated anticipated elongations to determine print image locations on printing formes before those printing formes are mounted on printing cylinders. It is clear from a careful reading of the Rodi reference that its combination with the Kusunoki reference, to the extent that such a combination would be appropriate, does not render the method of claim 43 obvious to one of skill in the art.

The Langsch reference was cited as showing the use of an image regulator 6 in a printing press. It is acknowledged that image regulators are generally known in the prior art. The image regulator 6 of the Langsch reference is a multiple roller unit, as depicted in Fig. 2 of the reference. There is no teaching in Langsch of use of the image regulator for other than its suggested purpose. The incorporation of an image regulator,

as taught by the Langsch reference, into the combination of the Kusunoki and Rodi references would not overcome the various deficiencies of those references, as discussed above.

Claims 55-57 depend from believed allowable, currently amended claim 43. They are also believed to be allowable. The secondary reference to Wang does not provide any of the teachings which are missing from the other three references cited and relied on.

Claims 44-54 and 58-62 were withdrawn from consideration in response to the Restriction Requirement which was mailed to the undersigned on June 5, 2008. It was noted that claim 43 linked all of the asserted II groups of inventions. It is requested that, upon the allowance of claim 43, that claims 44-54 and 58-62 be rejoined and that they also be allowed, based on their dependancy from believed allowable, currently amended independent claim 43.

SUMMARY

Independent claim 43 has been further amended to more clearly patentably define the subject invention over the prior art of record. Claims 55-57 have been carried forward. Claims 44-54 and 58-62 remain withdrawn pending the allowance of claim 43. At that time, it is requested that they be rejoined.

For the reasons set forth above, claim 43 is believed to be patentable over the prior art cited and relied on, taken either singly or in combination. Allowance of the claims, and passage of the application to issue, is respectfully requested.

Respectfully Submitted,

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